

KODAK Pan Film 2484 (ESTAR-AH Base)

PHOTOGRAPHIC AND PHYSICAL PROPERTIES



KODAK Pan Film 2484 (ESTAR-AH Base) is an extremely high-speed panchromatic film which is very useful for photorecording under weak illumination or when extremely short exposure times are encountered. A wide range of Exposure Index values may be used with this film, depending on the contrast of the original scene and the development selected. The high speed and flexibility of exposure and processing characteristics provide a unique capability for photorecording under a wide variety of conditions.

Features

- Extremely high speed
- Panchromatic
- ESTAR-AH Base (a tough, dimensionally stable, polyester support). The 0.10 density of this base reduces light piping and provides halation protection.
- Fast-drying PX backing

Uses

- Cine photography under low-light-level conditions
- CRT photography
- High-speed photography
- Missile tracking and reentry phenomena
- Spark-chamber photography

Color Sensitivity

Panchromatic

Darkroom Handling

KODAK Pan Film 2484 (ESTAR-AH Base) should be handled in total darkness.

Storage

For best storage, keep the unopened box in a cool place 21 C (70 F) or below. To avoid moisture condensation on film that has been refrigerated, allow 16mm film to stand at room temperature for at least 1 to 1½ hours before removal from the package; for 35mm film, allow 2 to 3 hours.

Base

.004-inch ESTAR-AH with 0.10 density

Exposure Information

Photorecording Sensitivity: 800 [KODAK Developer D-19 for 4 minutes at 20 C (68 F)]. This figure is based on the reciprocal of the tungsten exposure in meter-candle-seconds required to produce a density of 0.10 above gross fog at an exposure time of 1/10,000 of a second and recommended development.

CRT Exposure Index: The figures given below are based on the reciprocal of the exposure in ergs/cm² required to produce the densities listed with the given simulated phosphors and with development in KODAK Developer D-19 for the times and temperatures listed.

Simulated Phosphor	Time, Temperature	CRT Exposure Index at Net Density of 0.10
P11	4 min, 20 C (68 F) 1 min, 35 C (95 F)	320 400
P16	4 min, 20 C (68 F) 1 min, 35 C (95 F)	500 650
P24	4 min, 20 C (68 F) 1 min, 35 C (95 F)	250 320

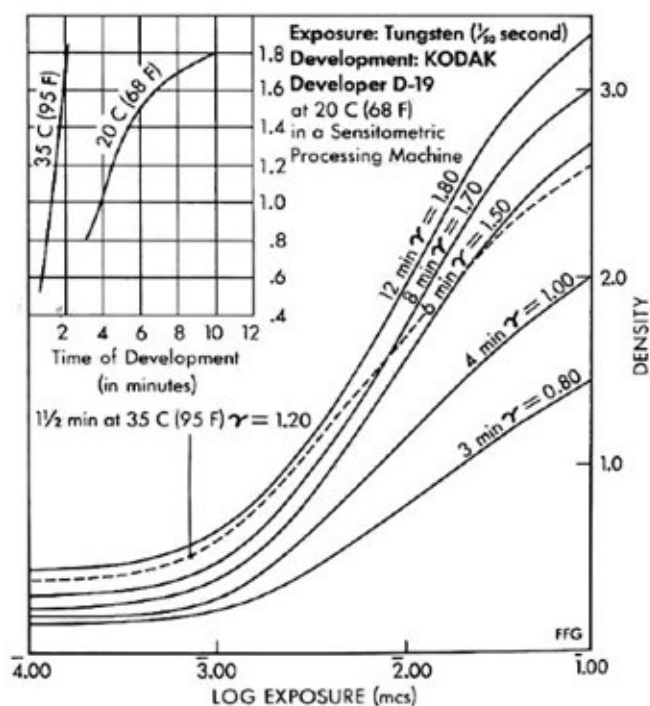
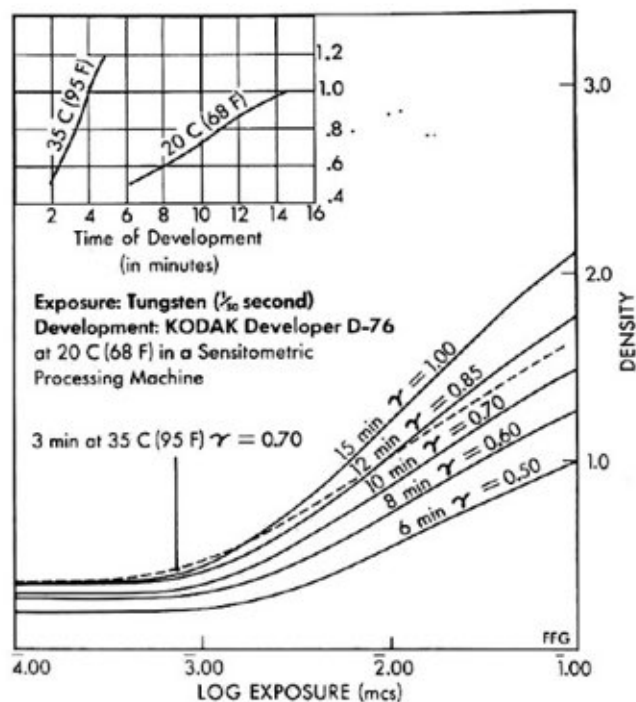
Exposure Index: These Exposure Index values are for use with meters marked in "ASA" Speeds or Exposure Indexes. Use the meter to evaluate incident light or light reflected from a KODAK Neutral Test Card (18 percent gray side). If a reflected-light type meter is used to measure either a white card or the highest luminance being photographed, divide the meter setting by 5.

Exposure Index	KODAK Developer	Time in Minutes	Temperature	Gamma
3200°	D-19	1 1/4	35 C (95 F)	1.0
3200°	D-76	4	35 C (95 F)	1.0
2000°	D-19	4	20 C (68 F)	1.0
2000°	D-76	15	20 C (68 F)	1.0
1000†	D-76	3	35 C (95 F)	0.7
800†	D-76	10	20 C (68 F)	0.7

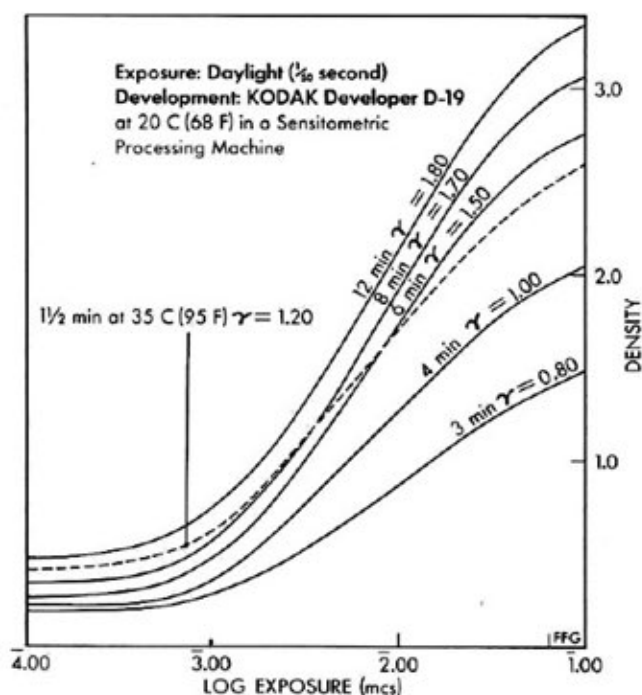
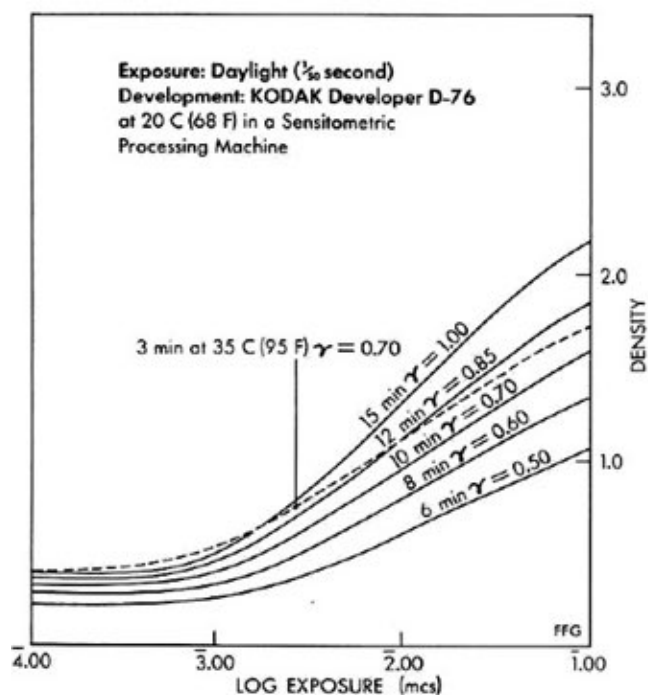
* For low-contrast or flatly lighted scenes with development to a gamma of 1.0 and no exposure safety factor.

† For photography of scenes with normal contrast and development to a gamma of 0.7 with the usual ASA exposure safety factor.

Characteristic Curves



Characteristic Curves



The sensitometric curves and data in this publication represent product tested under the conditions of exposure and processing specified. They are representative of production coatings and, therefore, do not apply directly to a particular box or roll of photographic material. They do not represent standards or specifications which must be met by Eastman Kodak Company. The company reserves the right to change and improve product characteristics at any time.

Image-Structure Characteristics

This information is based on development in KODAK Developer D-19 for 4 minutes at 20 C (68 F).

Resolving Power

Test-Object Contrast	Values*	Classification
1,000:1	63 lines/mm	Medium
1.6:1	25 lines/mm	—

*This value was determined as described in "A Simple Camera for the Measurement of Photographic Resolving Power," by J. H. Altman, *Photographic Science and Engineering*, V No. 1, (January-February 1961), pp 17-20.

RMS Granularity (at a net diffuse density of 1.0)

Value*	Classification
30	Moderately Coarse

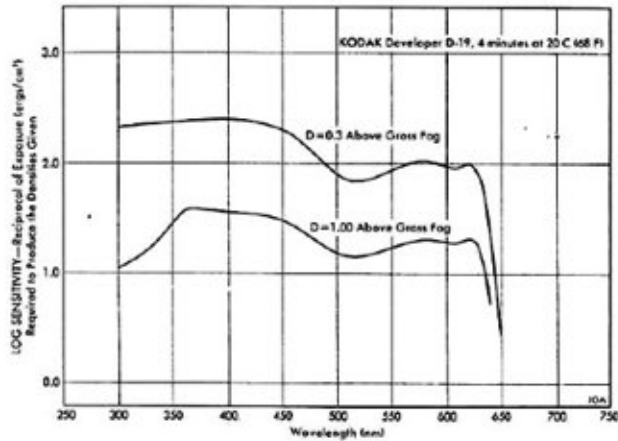
*This value represents 1000 times the standard deviation in density produced by the granular structure of the material when a uniformly exposed and developed sample is scanned by a densitometer having an optical-system aperture of $f/2.0$ and a circular scanning aperture of 48 micrometers in diameter. The value is proportional to the sensation of graininess which would be perceived if the sample were viewed at a magnification of 12x.

The sensation of graininess will increase or decrease with viewing magnification; e.g., if the viewing magnification is doubled, the value is about doubled.

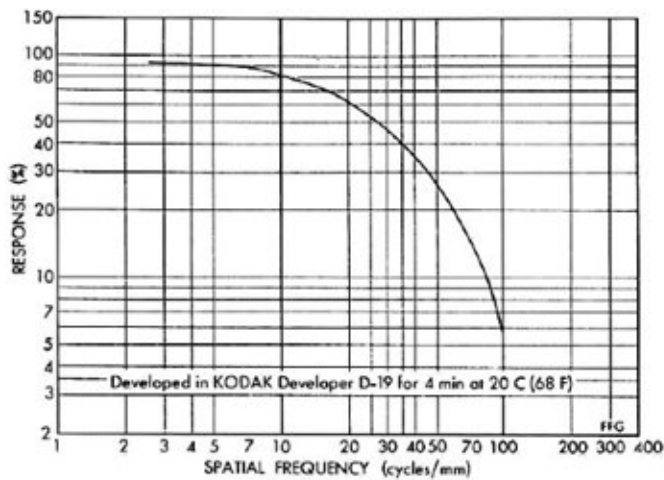
The graininess of a print is also affected by the printing operation. Granularity is changed roughly in proportion to the contrast of the print material; e.g., if a negative of granularity value 10 is printed onto a material of contrast 2.0, the granularity of the print will be about 20 [see "Wiener-Spectrum Analysis of Photographic Granularity," by E. C. Doerner, *Journal of the Optical Society of America*, LII (June 1962), p 699].

If the threshold of the human eye is substantially exceeded in each case, it appears (from our limited data) that a difference of about 5 percent in the effective value of rms granularity corresponds to a just noticeable difference in the visual impression of graininess.

Spectral Sensitivity Curves



Modulation Transfer Function Curve



Reciprocity Data

The following chart describes the speed, exposure, and contrast changes required over the range of exposure time indicated. The film was processed in KODAK Developer D-19, for 4 minutes, at 20 C (68 F).

	Exposure Time in Seconds (Tungsten)								
	10 ²	10 ¹	10 ⁰	10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵	10 ⁻⁶
Speed*	-80%	-60%	-20%	Reference				-20%	-40%
Exposure Adjustment†	+2½	+1½	+½	None				+⅓	+⅔
Contrast Change‡	None								+10%

*Speed—at a net density of 1.0

†Exposure Adjustment—in photographic stops

‡Contrast Change—between net densities of 0.3 and 1.0

PROCESSING

DEVELOP: Use continuous agitation for the following times.

KODAK Developer	Temperature			
	20 C (68 F)	24 C (75 F)	29.5 C (85 F)	35 C (95 F)
D-19 (constant speed*)	4 min	2¾ min	1¾ min	1 min
D-76 (gamma of 1.0)	15 min	11 min	6½ min	4 min
D-76 (gamma of 0.7)	10 min	7 min	4½ min	3 min

*at a density of 0.30 above fog

RINSE: Use KODAK Stop Bath SB-1a, or KODAK LINAGRAPH Stop Bath for 20 to 40 seconds at 18.5 to 35 C (65 to 95 F).

FIX:

Fixer	Fixing Time at	
	18.5 C to 21 C (65 F to 70 F)	35 C (95 F)
KODAK LINAGRAPH Fixer, KODAK Fixer, or KODAK Fixing Bath, F-5	8 to 12 minutes	4 to 6 minutes
KODAK Rapid Fixer	2 to 3 minutes	1 to 2 minutes

For rapid access to data, fix only for the time required for the negative to clear. If the negative is to be preserved, it must be returned to the fixing bath for the total fixing time as recommended above, and then washed and dried.

WASH: Use clear, running water for the times listed below.

When Fixed in	Washing Time at	
	18.5 C to 21 C (65 F to 70 F)	35 C (95 F)
KODAK LINAGRAPH Fixer, KODAK Fixer, or KODAK Fixing Bath, F-5	10 to 20 minutes	5 to 10 minutes
KODAK Rapid Fixer	15 to 30 minutes	10 to 20 minutes

Rapid Wash: To reduce washing time and to conserve water, rinse the film in running water for 20 seconds to remove the excess hypo, and then immerse it in KODAK Hypo Clearing Agent for 1 to 2 minutes. Follow this with a 1- to 3-minute wash, allowing at least one change of fresh water during this time.

DRY: Dry the film in a dust-free place.

SIZE DATA AND ORDERING INFORMATION

Sizes Available: All of the specifications and sizes listed below are regularly stocked. In some cases, minimum-order requirements will apply. Check with your instrumentation products dealer or with Instrumentation Products Sales, Eastman Kodak Company, 343 State Street, Rochester, New York 14650, Telephone: (716) 724-4000.

When ordering, include the following information:

- | | |
|---------------------------|-------------------------|
| 1. Number of rolls | 3. Film name |
| 2. Sizes—width and length | 4. Specification number |

Example: 2 rolls, 35mm x 150 ft, KODAK Pan Film 2484 (ESTAR-AH Base), SP415.

Sizes		Specification (Sp)
mm	ft	Numbers
16 x 450		434
35 x 150		417
35 x 200		760
70 x 100		473
70 x 150		475

Description of Specification (Sp) Numbers

NOTE: All films are wound emulsion in unless otherwise noted. Also, unless noted, all films are edge-printed (e.g., "Kodak Safety Film" along the edge of the film).

415: 35mm, darkroom load, K.S. perforations, on No. 10 spool (S-83) for 35mm high-speed cameras. Footage numbered, with integral leader and trailer.

417: 35mm, darkroom load, B. & H. perforations, on No. 10 spool (S-83). Integral leader and trailer.

430: 16mm, darkroom load, perforated two edges with .3000-inch pitch, on KODAK Spool (R-90), for 16mm high-speed cameras. Footage numbered, with integral leader and trailer.

434: 16mm, darkroom load, perforated two edges with .3000-inch pitch, on camera spool (S-153). Footage numbered, no leader or trailer.

NOTE: KODAK Pan Film 2484 (ESTAR-AH Base) requires loading and unloading in total darkness.

KODAK High Speed Recording Films

For low-contrast or flatly lighted subjects—Development for maximum speed.

KODAK Film	Exposure Index ¹	Photo-recording Sensitivity ²	CRT Exposure Index ³ (Simulated P11 Phosphor)	Resolving Power	RMS Granularity	Processing		
						KODAK Developer	Time (in min)	Temperature
High Speed Recording 2485 (ESTAR-AH Base)	5,000	1,250	640	50	42 ⁴	857	2½	35 C (95 F)
Recording 2475 (ESTAR-AH Base)	3,200	1,250	400	63	33 ⁴	DK-50	8	20 C (68 F)
Pan Film 2484 (ESTAR-AH Base)	2,000	800	320	63	30 ⁴	D-19	4	20 C (68 F)

For normal pictorial photography or average scenes—Development for 0.65 to 0.80 gamma.

KODAK Film	Exposure Index ¹	Processing		
		KODAK Developer	Time (in min)	Temperature
High Speed Recording 2485 (ESTAR-AH Base)	800	857	1½	35 C (95 F)
Recording 2475 (ESTAR-AH Base)	1,000	DK-50	5	20 C (68 F)
Pan Film 2484 (ESTAR-AH Base)	1,000	D-76	3	35 C (95 F)

1. For use with meters marked in Exposure Indexes or ASA Speeds.

2. Defined as 1/E @ 0.10 above gross fog; 1/10,000 sec tungsten exposure.

3. Measured at a density of 1.0 above gross fog.

4. Measured at a diffuse density of 1.0.

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